

Claims

- 1 1. A method for removing contaminate particulate matter from a contaminate
2 particle containing substrate surface comprising the steps of:
3 applying a sacrificial coating of a material to a substrate surface containing
4 undesirable particulate matter thereon, which material is to encapsulate and
5 suspend the undesirable particles therein;
6 fluidizing the material if necessary;
7 applying energy to the coated substrate to dislodge at least some of the particulate
8 matter from the surface of the substrate into the sacrificial coating such that the
9 particulate matter is partially or fully encapsulated and suspended within the
10 sacrificial coating forming a particulate matter containing sacrificial material
11 coating; and
12 removing the particulate matter containing sacrificial material coating from the
13 substrate surface providing a substrate surface having less particulate matter
14 thereon.
- 1 2. The method of claim 1 wherein the substrate is a semiconductor wafer.
- 1 3. The method of claim 1 wherein the sacrificial coating material is a fluid.
- 1 4. The method of claim 1 wherein the energy used is sonic energy.
- 1 5. The method of claim 1 wherein the energy used is thermal, centrifugal,
2 magnetic or vibrational.
- 1 6. The method of claim 1 wherein the sacrificial coating material is a liquid.

1 7. The method of claim 1 wherein the sacrificial coating material is a curable
2 polymer.

1 8. The method of claim 7 wherein the sacrificial coating material is formed into a
2 film.

1 9. The method of claim 1 wherein the substrate is inclined and the material is a
2 sacrificial coating applied to an upper part of the substrate so that the sacrificial
3 coating material flows downward over the substrate surface and removes contaminant
4 particles therefrom.

1 10. The method of claim 1 wherein the material is a gas, liquid, vapor or fluid
2 polymer.

1 11. An apparatus for removing contaminate particulate matter from a contaminate
2 particle containing substrate surface comprising:

3 a support for supporting a substrate containing undesirable particulate matter on
4 the surface of the substrate;

5 means for applying a sacrificial material coating on the surface of the substrate,
6 which material is to encapsulate and suspend the undesirable particles therein;

7 means for fluidizing the material if necessary;

8 energy forming means to dislodge at least some of the particulate matter from the
9 surface of the substrate into the sacrificial material coating such that the

10 particulate matter is partially or fully encapsulated and suspended within the
11 sacrificial material coating forming a particulate matter containing sacrificial
12 material coating; and

13 means for removing the particulate matter containing sacrificial material coating
14 from the surface of the substrate providing a cleaned substrate surface.

- 1 12. The apparatus of claim 11 wherein the substrate is a semiconductor wafer.
- 1 13. The apparatus of claim 11 wherein the sacrificial coating material is a fluid.
- 1 14. The apparatus of claim 11 wherein the energy is sonic energy.
- 1 15. The apparatus of claim 11 wherein the energy means is thermal, centrifugal,
2 magnetic or vibrational.
- 1 16. The apparatus of claim 11 wherein the sacrificial coating material is a liquid.
- 1 17. The apparatus of claim 11 wherein the sacrificial coating material is a curable
2 polymer.
- 1 18. The apparatus of claim 17 wherein the sacrificial coating material is formed
2 into a film.
- 1 19. The apparatus of claim 11 wherein means are provided to incline the substrate
2 and the sacrificial material applied to the upper part of the inclined substrate flows
3 downward over the substrate and removes contaminant particles therefrom.
- 1 20. The apparatus of claim 11 wherein the material is a gas, liquid, vapor or fluid
2 polymer.
- 1 21. A semiconductor electronic component made using the method of claim 1.
- 1 22. A semiconductor electronic component made using the method of claim 4.
- 1 23. A semiconductor electronic component made using the method of claim 5.

1 24. A semiconductor electronic component made using the method of claim 7.

1 25. A semiconductor electronic component made using the method of claim 9.